II. Remarks

Reconsideration and allowance are respectfully requested in view of the foregoing amendments and the following remarks. Claims 1, 3-6, and 8-22 are pending. Claims 1, 3-6, 10-12, 16, 17, and 22 have been amended to more precisely describe embodiments of the invention. Claims 2 and 7 have been canceled without prejudice or disclaimer to the subject matter therein. Claims 1, 10, and 16 are independent.

A. Drawings

The Office objected to the drawings under 37 C.F.R. 1.83(a), which provides that "[t]he drawing in a nonprovisional application must show every feature of the invention specified in the claims."

The Applicant respectfully requests that the objection be withdrawn because the "semi-conductive material in contact..." recited in claim 1 and the "first semi-conductive material..." recited in claim 16 are shown in Figure 5 as the semiconductive material 240.

Further, the Applicant notes that there is no requirement in U.S. patent law that all claimed features be shown in a single drawing. To the contrary, subsets of features can be shown in respective drawings consistent with Rule 83(a). Accordingly, Figure 1 need not be amended to show the claimed voltage screens, which are already shown in Figure 4.

As further explained below, the Applicant submits that the movable voltage screen 220 can in fact move within the encapsulation 190, and that the content of Figure 4 need not be modified.

For at least the above reasons, the Applicant submits that the objections to the drawings are overcome.

B. Claim Rejections – 35 U.S.C. § 112

The Office rejected claims 3 and 16-22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention.

The Office stated that, in claims 3 and 17, the phrase "or the like" renders those claims indefinite. The Applicant has deleted that phrase from claims 3 and 17.

With respect to claim 16, the Office stated that "[i]t is not clear how the vacuum interrupter will function, if the second voltage screen 220 is encapsulated (second voltage screen 220 is disclosed as movable voltage screen...)." The Applicant respectfully points out that claim 16 does not specifically recite that the second voltage screen is movable, or that the second voltage screen is fixably attached to the molded dielectric material. In certain embodiments in which the second voltage screen is movable, the Applicant submits that a person of ordinary skill in the art will appreciate that the encapsulation 190 defines a boundary within which the second voltage screen 220 is free to move.

For at least the above reasons, the Applicant respectfully requests that the rejection of claims 3 and 16-22 under 35 U.S.C. § 112, second paragraph, be withdrawn.

C. Claim Rejections – 35 U.S.C. § 103(a)

The Office rejected claims 1-9 under 35 U.S.C. § 103(a) as being unpatentable over Luzzi (U.S. Patent No. 5,808,258) in view of Cherry (U.S. Patent No. 4,002,867), and claims 10-22 under 35 U.S.C. § 103(a) as being unpatentable over Luzzi in view of Cherry and further in view of Bohme et al. (U.S. Patent No. 4,618,749).

The Applicant respectfully traverses the rejections because the cited references, taken alone or in combination, fail to teach or suggest the combination of features recited in the rejected claims. However, the claims have been amended to more precisely describe embodiments of the invention. The amendments do not present new matter. For example, Figures 2-4 show an interrupter 100 that is completely encapsulated by a one-piece molded material. (See also para. 18.) Further, Figure 5 and paragraph 21 show that the exposed central portion of the vacuum chamber 110 is coated with a semiconductive material 240, and that bands at end portions of the vacuum chamber are substantially free of the semiconductive material 240.

1. Claims 1-9

Independent claim 1, as amended, recites a vacuum interrupter comprising:

> dielectric encapsulation having a one-piece molded material and configured to substantially encapsulate the vacuum interrupter;
>
> a vacuum chamber molded into the dielectric encapsulation, the vacuum chamber comprising:
>
> a ceramic housing;

a first end cap sealing the housing;

a second end cap sealing the housing;

a floating shield within the housing; and

an exposed ring integral with the housing and coupled with the floating shield;

a semi-conductive material in contact with the exposed ring and disposed on a central portion of the vacuum chamber ceramic housing such that bands at end portions of the vacuum chamber ceramic housing are substantially free of the semi-conductive material;

a first voltage screen connected to the first end cap; and

a second voltage screen connected to the second end cap,

said first voltage screen overlapping a first portion of the semi-conductive material, and

said second voltage screen overlapping a second portion of the semi-conductive material.

The cited references fail to teach or suggest at least the above-underlined features of claim 1.

Luzzi discloses an encapsulated high voltage vacuum switch with an elastomeric housing 10 made of a first high dielectric strength resilient material. (Abstract.) The housing 10 includes various sub-components fabricated by insert molding (col. 6, line 15) and bonded together (col. 6, lines 33-36) to form an assemblage (col. 6, lines 36-39), such as a diaphragm 26, an insert 32, a reinforcing element 36, and an exterior support element 42. Related fabrication processes are described at column 6, lines 15-40.

Thus, Luzzi fails to teach or suggest dielectric encapsulation "having a one-piece molded material and configured to substantially encapsulate the vacuum interrupter," as recited in claim 1. Instead, as described above, Luzzi employs various sub-components bonded together.

Moreover, the Examiner admitted in the Office action (see page 4) that Luzzi fails to disclose a semi-conductive material in contact with the exposed ring and disposed on a portion of the vacuum chamber ceramic housing. Accordingly, Luzzi fails to teach or suggest "a semi-conductive material ... disposed on a central portion of the vacuum chamber ceramic housing such that bands at end portions of the vacuum chamber ceramic housing are substantially free of the semi-conductive material," as recited in amended claim 1.

Cherry discloses a vacuum-type circuit interrupter with a condensing shield that is maintained at a predetermined potential relative to separable contacts by the use of resistance

means that are tapped off to the condensing shield. Cherry teaches the use of a resistive voltage divider to control the voltage potential of the condensing shield. (Col. 2, line 67 to col. 3, line 8.) A resistive coating covers the inside and/or outside of the interrupter envelope and forms a complete bridge between both ends of the vacuum interrupter. (Figures 7 & 8; col. 1, lines 33-36; col. 4, lines 32-35; Abstract, lines 10-13.)

Thus, Cherry fails to teach or suggest dielectric encapsulation "having a one-piece molded material and configured to substantially encapsulate the vacuum interrupter," as recited in claim 1. Similarly, Cherry fails to teach or suggest "a semi-conductive material ... disposed on a central portion of the vacuum chamber ceramic housing such that bands at end portions of the vacuum chamber ceramic housing are substantially free of the semi-conductive material," as recited. To the contrary, as discussed above, the resistive coating in Cherry forms a complete bridge between both ends of the vacuum interrupter.

Moreover, it should be appreciated that the purpose of the coating in Cherry and the purpose of the coating in the claimed invention are markedly different. In Cherry, a nearly nonconductive coating is used as resistance means to control the voltage potential on the condensing shield of the interrupter. In the claimed invention, a nearly conductive coating is used to eliminate voltage stress on the ends of the floating shield 105. (Para. 22.)

For at least the above reasons, claim 1 is not unpatentable over Luzzi in view of Cherry, and the rejection under 35 U.S.C. § 103(a) should be withdrawn. Claims 2-9, which depend directly or indirectly from claim 1, are patentable for the above reasons and for the additional features recited therein.

2. Claims 10-22

Independent claim 10 recites a system for mitigating electric field distortion, comprising, among other things, "a semi-conductive material applied to an exterior central portion of the vacuum chamber disposed within the shielded encapsulation such that bands at exterior end portions of the vacuum chamber are substantially free of the semi-conductive material." Independent claim 16 recites a method for mitigating electric field distortion, comprising, among other things, "disposing a first semi-conductive material on an exterior central portion of the vacuum chamber and contacting the exposed ring such that bands at exterior end portions of the vacuum chamber are substantially free of the semi-conductive material."

The cited references fail to teach or suggest at least the above-underlined features of claims 10 and 16. As noted above in connection with claim 1, Luzzi does not disclose a semi-conductive material, and the resistive coating in Cherry forms a complete bridge between both ends of the vacuum interrupter.

Bohme fails to remedy the deficiencies of Luzzi and Cherry with respect to the limitation "bands at exterior end portions of the vacuum chamber are substantially free of the semi-conductive material" recited in claims 10 and 16. Bohme merely discloses a vacuum switching apparatus inserted into an insulating material such as epoxy resin, with no disclosure relating to a semi-conductive material as recited.

For at least the above reasons, claims 10 and 16 are not unpatentable over Luzzi in view of Cherry and Bohme, and the rejection under 35 U.S.C. § 103(a) should be withdrawn. Claims 11-15 and 17-22 respectively depend from claims 10 and 16 and are patentable for the above reasons and for the additional features recited therein.

D. Conclusion

All rejections having been addressed, the Applicant submits that the present claims are in condition for allowance. The Applicant requests that the Examiner call the attorneys of record in the event that a telephone discussion would be helpful in advancing the prosecution of the present application.

Respectfully submitted,

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